8. The method of claim **4**, wherein the step of determining the gyromagnetic ratios for nuclear spin for the three nuclear moment gases γ_n and the proportionality factor b through calibration comprises the step of:

adjusting a temperature within the nuclear magnetic resonance cell and a light level within the nuclear magnetic resonance cell to determine the proportionality factors b_n.

9. The method of claim **4**, further comprising the step of determining the rotational rate information as:

$\Omega=\gamma_1 H+b_1 c-\omega_1$ where

$$H=\frac{(\omega_1-\omega_2)(b_2-b_3)-(\omega_2-\omega_3)(b_1-b_2)}{(\gamma_1-\gamma_2)(b_2-b_3)-(\gamma_2-\gamma_3)(b_1-b_2)}\text{ and}$$

$$c=\frac{(\omega_1-\omega_2)(\gamma_2-\gamma_3)-(\omega_2-\omega_3)(\gamma_1-\gamma_2)}{(\gamma_2-\gamma_1)(b_1-b_2)-(\gamma_1-\gamma_2)(b_2-b_3)}.$$

10. An apparatus, comprising:

a nuclear magnetic resonance cell; and

a photodetector;

wherein the nuclear magnetic resonance cell comprises first, second, and third nuclear moment gases and at least one optically pumpable substance;

wherein the nuclear magnetic resonance cell receives detection light that passes through the nuclear magnetic resonance cell;

wherein the first, second, and third nuclear moment gases and the at least one optically pumpable substance cooperate to modulate the detection light based on an applied magnetic field and local magnetic fields and pass transmitted light to the photodetector;

wherein the photodetector receives the transmitted light through the nuclear magnetic cell and determines a rotational rate with compensation for the first, second, and third local magnetic fields by approximating the first, second, and third local magnetic fields as a base magnetic field multiplied by corresponding first, second, and third proportionality factors.

11. The apparatus of claim **10**, wherein the at least one optically pumpable substance comprises an alkali vapor.

12. The apparatus of claim **11**, wherein the alkali vapor comprises rubidium.

13. The apparatus of claim **10**, wherein at least one of the first, second, and third nuclear moment gases comprise isotopes of at least one noble gas.

14. The apparatus of claim **13**, wherein the at least one noble gas comprises krypton-83, xenon-129, or xenon-131.

15. The apparatus of claim **10**, wherein the nuclear magnetic resonance cell comprises at least one buffer gas of helium or nitrogen.

16. The apparatus of claim **10**, further comprising:

a pumping light generator that directs circularly polarized optical pumping light through the nuclear magnetic resonance cell;

a steady magnetic field generator that applies the applied magnetic field along a z-axis of the nuclear magnetic resonance cell;

a feedback magnetic field generator that applies a sinusoidal AC feedback magnetic field in an x-direction of the nuclear magnetic resonance cell;

a detection light generator that directs detection light through the nuclear magnetic resonance cell, wherein the detection light comprises a wavelength approximately equal to a wavelength which can be absorbed by the at least one optical pumpable substance; and

a carrier magnetic field generator that applies a superimposed AC carrier magnetic field.

17. The apparatus of claim **16**, wherein the sinusoidal AC feedback magnetic field comprises first, second, and third feedback signals of different frequencies;

wherein the feedback magnetic field generator superimposes the first, second, and third feedback signals.

18. The apparatus of claim **17**, wherein the feedback magnetic field generator matches a frequency and phase of the first feedback signal with a Larmor precession frequency of the first nuclear moment gas;

wherein the feedback magnetic field generator matches a frequency and phase of the second feedback signal with a Larmor precession frequency of the second nuclear moment gas;

wherein the feedback magnetic field generator matches a frequency and phase of the third feedback signal with a Larmor precession frequency of the third nuclear moment gas.

19. The apparatus of claim **18**, wherein the superimposed AC carrier magnetic field comprises a frequency ω that is close to a Larmor precession frequency of the at least one optically pumpable substance.

* * * * *